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DISPOSABLE DIAPER

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[There are no amendments to this patent.]

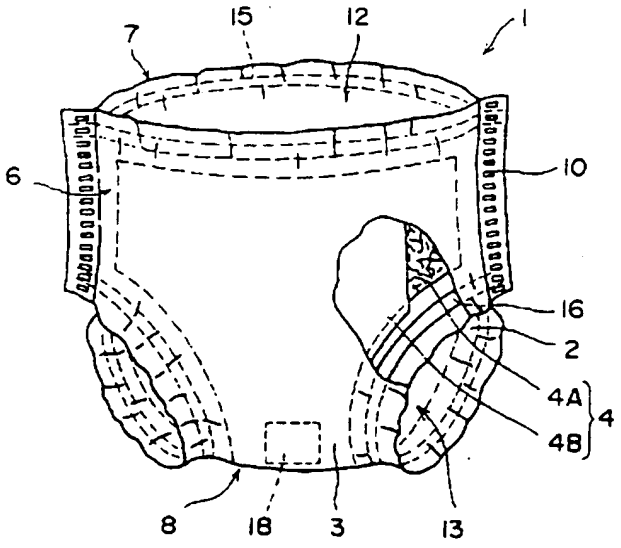
Abstract

Problems

To reliably prevent the volatile material [in a diaper] from being volatilized before an excretion and to reliably volatilize the volatile material after an excretion.

Means to solve

In a disposable diaper (1), in which a liquid-absorbing core (4) is interposed between a liquid-permeable top sheet (2) and a liquid-impermeable back sheet (3), a volatile material sealed body (18), in which a volatile material is sealed in a water-soluble covering material, is contained within the liquid-absorbing core (4), for example, and the water-soluble covering material is dissolved by the water of an excretion so that the volatile material is released.



Claim

A disposable diaper, in which a liquid-absorbing core is interposed between a liquid-permeable top sheet and a liquid-impermeable back sheet, characterized by a volatile material sealed body, in which a volatile material is sealed in a water-soluble covering material, is contained within the aforementioned liquid-absorbing core, between the aforementioned liquid-absorbing core and the aforementioned liquid-permeable top sheet, or between the aforementioned liquid-absorbing core and the aforementioned liquid-impermeable back sheet, and by having the aforementioned water-soluble covering material dissolved by the water of an excretion in order to release the aforementioned volatile material.

Detailed explanation of the invention

[0001]

Technical field of the invention

This invention concerns a disposable diaper. In more detail, it concerns a disposable diaper in which a fragrance is spread, or the smell is removed or prevented, for example, when an excretion is discharged.

[0002]

Prior art

There was an existing disposable diaper which utilized a body fluid-absorbing material, within which a volatile fragrance is mixed. In this type of diaper, it is possible to prevent an odor by spreading the fragrance during use.

[0003]

Also, there was another disposable diaper, in which a fragrance-providing agent, in which a containing a perfume within a dried powder of a water-insoluble polymer possessing highly advanced water expandability and water-retaining power, is added to the liquid-absorbing core, for example, of a diaper, and the aforementioned water-insoluble polymer expanded when water was absorbed from the urine, for example, and the perfume is volatilized through cross links that have been loosened (Japanese Kokai Patent Application No. Sho 61[1986]-68042). In this type of disposable diaper, the perfume is diffused through an excretion. Therefore, it is possible for a mother, for example, to find out about her baby's excretion using the smell as a clue.

[0004]

Problems to be solved by the invention

However, in disposable diapers in which a volatile perfume is mixed within an absorbment material, the perfume has already

volatilized even before use, and there is the possibility that the fragrance has weakened with passage of time, and it is not very useful when there is an actual excretion. Also, even if the fragrance is maintained and the excretion odor can be concealed, the intensity of the fragrance does not necessarily change by the excretion. Therefore, an excretion cannot be detected using the fragrance as a clue, in other words, [the fragrance] did not function as an indicator, and it was difficult to change the diaper at the proper time.

[0005]

Also, in a disposable diaper disclosed in the official report for the Japanese Kokai Patent Application No. Sho 61[1986]-68042, which uses a fragrance-providing agent, it is possible to detect an excretion by the baby using the fragrance as a clue, but it takes time after the excretion until the fragrance starts spreading because the perfume is exposed for the first time when the water-insoluble polymer has absorbed water has expanded to some degree and it is not until the polymer layer breaks that the fragrance begins to spread. As a result, the detection of the excretion was delayed, and it was difficult to change the diaper at the proper time.

[0006]

The aim of this invention is to offer a disposable diaper in which the volatilization of the volatile material before an excretion is reliably prevented, and the volatile material can be reliably volatilized immediately after an excretion.

[0007]

Means to solve the problems

In order to attain said aim, this invention for a disposable diaper, in which a liquid-absorbing core is interposed between a liquid-permeable top sheet and a liquid-impermeable back sheet, has a structure in which a volatile material sealed body, in which a volatile material is sealed in a water-soluble covering material, is contained within a liquid-absorbing core, between the liquid-absorbing core and the liquid-permeable top sheet, or between the liquid-absorbing core and the liquid-impermeable back sheet, and the water-soluble covering material is dissolved by the water of an excretion in order to release the volatile material.

[0008]

Accordingly, the volatile material in the volatile material sealed body maintains a state in which it is still sealed within the water-soluble covering material at the point when a disposable diaper is put on, and it does not leak out and volatilize. Then, when a diaper user has an excretion, water of the excretion passes through the liquid-permeable top sheet and is absorbed into the liquid-absorbing core, makes contact with the volatile material sealed body within said liquid-absorbing core, or makes contact with the volatile material sealed body when [the water] enters between the liquid-absorbing core and the liquid-impermeable back sheet, immediately dissolves the water-soluble covering material and releases the volatile

material that had been sealed. The volatile material which leaks out starts to volatilize, the fragrance is immediately released when said volatile material is a perfume, for example. Also, when said volatile material is an odor-removing agent, for example, an attempt is made to remove the smell of the excretion immediately.

[0009]

The position of the volatile material sealed body is not particularly limited, however, it is ideally placed within a liquid-absorbing core or between the liquid-absorbing core and a liquid-impermeable back sheet. In this case, the direct attachment of the volatile material to the user can be prevented, and the volatile material can be transpired after the liquid-absorbing core has sufficiently absorbed the body fluid. Also, it is not necessary to seal the volatile material sealed body into the entire diaper or the entire liquid-absorbing core, and it is sufficient if it is contained at least in the region where waste is adhered. In this case, a minimum volatile material effectively functions as an indicator, which indicates an excretion, for example, or as an odor remover.

[0010]

Embodiment of the invention

The structure of this invention will be explained in detail based on one embodiment example shown in the figures.

[0011]

Figure 1 shows one embodiment example to which the disposable diaper of this invention is applied to a brief style diaper. This brief style diaper (1) consists of: a liquid-permeable top sheet (2), which touches the body directly or indirectly by way of a liquid-permeable sheet (3), for example; a liquid-impermeable back sheet; a core material (referred to as "liquid-absorbing core") (4), which is interposed between both of these sheets (2) and (3) and absorbs the body liquid that has been discharged. They are bonded liquid tight at the circumferential edges of each of the sheets (2) and (3) so that the liquid-absorbing core (4) in between is sealed. The brief style diaper (1) has the front body area (front bodice) (6), back body area (back bodice) (7), and a crotch area (8) positioned between these body areas (6) and (7). The respective edge areas of both body areas (6) and (7) overlap each other with the liquid-permeable top sheets (2) facing inwards, they are integrally bonded to each other at bonding areas (10), which are intermittently arranged in vertical directions, and an opening area around the body (12) and a pair of left and right opening areas around the legs (13) are formed. An elastic member around the body (15) or an elastic member around the legs (16) is attached at the circumferential edge of each of the opening areas (12) and (13), and these elastic members (15) and (16) are laminated in a stretched state between each of sheets (2) and (3) at least at one inner face of said sheets (2) and (3).

[0012]

A nonwoven fabric or a porous plastic film is used as the liquid-permeable top sheet (2), and a plastic film is used as the liquid-impermeable back sheet (3). Also, the liquid-absorbing core (4) consists of a core part (4A), which is formed into a roughly hourglass shape by a mixture of pulverized pulp and high absorbing polymer powder, and a covering part (4B) made of tissue paper and overlapping with it. A volatile material sealed body (18), which notifies [one] of an excretion of urine and other wastes accompanied by water content, is contained within said liquid-absorbing core (4). In this case, the water-soluble covering material (19) dissolves when a body fluid, such as urine, for example, is sufficiently absorbed into the liquid-absorbing core (4), and the volatile material (20) inside transpires. This volatile material sealed body (18) is contained at least in a region where a discharged waste adheres, for example, an area equivalent to the crotch shown in the figure. Also, the size, for example, of the volatile material sealed body (18) is not particularly restricted. An area and volume that can function at least as an indicator for notifying [one] of urination, for example, and as an odor-removing and odor-preventing material are sufficient, and it is not necessary for this to be of a size that occupies the entire area of the liquid-absorbing core (4) or the diaper (1).

[0013]

In the volatile material sealed body (18), a volatile material (20) is sealed by the water-soluble covering material

(19). The water-soluble covering material (19) is a water-soluble film, for example, that is formed into the shape of a bag. The conditions for the water-soluble film include stability to the perfume (oil) (excellent resistance to oils and solvents) and not being permeable. Furthermore, a resistance to heat sealing is also desirable. Materials for a water-soluble film satisfying these conditions include: PVA (polyvinyl alcohol), gelatin, paogen [transliteration], CMC (carboxymethylcellulose), and algnic acid, for example. However, when considering the possibility for immediate solubility with water, for example, the use of a PVA film that has a natural dissolubility is ideal. When using a PVA film as the water-soluble film, an ideal thickness would be 20-60 μm when considering the rate of dissolution, durability to the physical external pressure, and processability. When the film thickness is less than 20 μm, the durability against the physical external pressure is relatively high, and processing also becomes difficult. On the other hand, when the film thickness is greater than 60 μm, it takes a long time before the perfume inside leaks out after dissolution. However, it is also possible to use PVA films even at a film thickness outside of this range.

[0014]

In this implementation, water-soluble covering material securing sections (21) shown by the double dot and dash chain lines in Figure 3, which are near the circumferential edges of the water-soluble covering material (19), are heat sealed, and said water-soluble covering material (19) is formed into the shape of a bag. Also, it is not always necessary to form the

water-soluble covering material (19) into the shape of a bag, and the shape is not particularly limited as long as the volatile material (20) can be reliably sealed.

[0015]

The volatile material (20) is a volatile liquid or powder, for example. Perfumes, for example, can be listed as a volatile liquid. Ingredients, of the perfume are not particularly restricted. However, because there is the danger of the water-soluble covering material (19) dissolving before the diaper in this implementation is used when the perfume is already soaked in water before the perfume is sealed, it is ideal that materials, such as alcohols, glycols, and surfactants, for example, that easily absorb water should not be mixed to prevent this. Also, it is ideal that a hydrophobic solvent, such as isoparaffin or a hydrocarbon, for example, be mixed in 1-20 volumes per 1 volume of the perfume in order to prevent the absorption of water. Also, as the volatile powder, one in which the aforementioned perfume is carried on cellulose powder, for example, can be listed.

[0016]

A discharge of urine is made known in the following manner in a diaper having the construction above.

[0017]

A case in which a baby wears a brief style diaper (1) using perfume as the volatile material (20) is now considered. In a condition in which the product package of the brief style diaper (1) is opened and put on a baby, the perfume (20) is sealed within the water-soluble covering material (19). Therefore, it does not volatilize and spread the fragrance.

[0018]

Then, if the baby urinates, for example, the urine passes through the liquid-permeable top sheet (2) and is sufficiently absorbed by the liquid-absorbing core (4); it contacts the volatile material sealed body (18) and immediately dissolves the water-soluble covering material (19). As a result, the perfume (20) leaks out and volatilizes, and the fragrance starts to spread. For example, mother who is situated near the baby notices the urine discharge of the baby by this smell. In other words, the mother notices immediately after the urine is discharged, and the diaper can be changed at the proper time.

[0019]

The application example described above is one example of a satisfactory implementation of this invention, however, without being limited only to this, it can be implemented in many variations within a range that does not deviate from the essence of this invention. For example, not only is the volatile material sealed body (18) contained within the liquid-absorbing core (4),

it also may be contained on the outside of the liquid-absorbing core (4) between the liquid-absorbing core (4) and the liquid-impermeable back sheet (3). Furthermore, it may be arranged between the liquid-absorbing core (4) and the liquid-permeable top sheet (2), and its position is not particularly restricted if it is a position where it can come in contact with body fluid, such as urine, for example. However, it is practical to place the volatile material sealed body (18) within the liquid-absorbing core (4) or between the liquid-absorbing core (4) and the liquid-impermeable back sheet (3) so as to prevent the volatile material (20) from adhering to the skin of the diaper user, for example, the volatile material (20) transpires to indicate a discharge of urine, for example, after having the body fluid sufficiently absorbed into the liquid-absorbing core (4), and display the odor preventing effect, for example. Also, an example in which a perfume is used as the volatile material (20) is explained in this implementation, but without being limited only to the perfume, liquids or powders including odor removing agents, odor preventing agents, and disinfectants, for example, may certainly be used. Use of an odor removing agent and an odor preventing agent, for example, is ideal for the volatile material (20) particularly in disposable diapers for adults, and the prevention of the generation of an offensive odor can be attempted.

[0020]

Also, an example applied to a brief style diaper was explained in the embodiment above, but it certainly is not limited to the brief style diaper. Also, the embodiment applied

to a diaper was mainly explained, but the volatile material sealed body may be contained within a liquid-absorbing core or at the circumference of other body fluid-absorbing napkins, such as sanitary napkins, for example.

[0021]

Application examples

This invention will be further explained more concretely in the presentation of application examples in contrast with other comparative examples, but it is certain that this invention is not limited only to these examples.

Application Example 1

Using that shown in Table I as the volatile material sealed body (18), this volatile material sealed body (18) is contained at the center of an [liquid]-absorbing crotch area between the liquid-absorbing core (4) and the liquid-impermeable back sheet (3) as shown in Figure 1, and a brief style diaper (1) was manufactured. The volatile material sealed body (18) was formed into the shape of a bag by securing the circumference of the water-soluble covering material (19) by heat sealing, and perfume A was sealed in.

[0022]

Table I

1 揮発性物封入体

水溶性被覆材 2	ＰＶＡ３０μｍフィルム 3
香料Ａ 4	０．１ｇ（柑橘系） 5

Key: 1 Volatile material sealed body
2 Water-soluble covering material
3 PVA 30 μm film
4 Perfume A
5 0.1 g (citrus type)

Table II shows the composition of perfume A.

[0023]

Table II

香料Aの組成 1

レオンオイル 2	10
ライムオイル 3	5
オレンジオイル 4	15
スチラリールアセテート 5	5
トリプラール 6	1
ゲラニオール 7	10
トナリッド 8	4
リモーネン 9	50
	計100 10

Key: 1 The composition of perfume A
2 Lemon oil
3 Lime oil
4 Orange oil
5 Styrallyl acetate
6 Tripal
7 Geraniol
8 Tonalid
9 Limonene
10 Total of 100

Comparative Example 1

A brief style diaper was manufactured by coating only 0.1 g of the aforementioned perfume A over the tissue paper (covering part) (4B) of the absorbing core (4).

Comparative Example 2

A brief style diaper was manufactured containing a powder, in which only 0.1 g of perfume A is uniformly integrated in 1 g of cyclic dextrin, in the absorbing core (4).

Comparative Example 3

A brief style diaper was manufactured containing a powder, in which only 2 g of perfume A are uniformly integrated in 5 g of cyclic dextrin, in the absorbing core (4).

Comparative Example 4

That shown in Table III was used as the volatile material sealed body (18), and a brief style diaper was manufactured by storing this volatile material sealed body (18) in the center of the absorbing crotch between the liquid-absorbing core (4) and the liquid-impermeable back sheet (3). Unlike the diaper in Application Example 1, a water-insoluble covering material was used instead of the water-soluble covering material (19). The circumference of this water-insoluble covering material was secured by heat sealing and formed into the shape of a bag, and perfume A was sealed within. Also, the volatile material sealed body, immediately after perfume A was sealed in, was used.

[0024]

Table III

1 揮発性物封入体

水膨潤性被覆材 2	PEO（ポリエチレンオキサイド） 3 架橋フィルム30μm
香料A 4	5 0.1g（柑橘系）

Key: 1 Volatile material sealed body
2 Water swelling [sic] covering material
3 PEO (polyethylene oxide) cross-linked film at 30 μm
4 Perfume A
5 0.1 g (Citrus type)

The brief style diapers in Application Example 1 and Comparative Examples 1-4, constructed in the manner above were used by 20 toddlers at ages 2-3 during diaper training, and each item was evaluated by their mothers. Table IV shows the evaluated results.

[0025]

Table IV

/ 母親による評価結果

		排尿前の 2 香料のにおい		排尿による 3 においの変化		排尿後の 4 香料のにおいの強さ		
		判る 5	判らない 6	判る 7	判らない 8	適正 9	不快（強い） 10	弱い 11
12	実施例1	0	20	20	0	20	0	0
13	比較例1	20	0	0	20	20	0	0
14	比較例2	20	0	0	20	20	0	0
15	比較例3	20	0	12	8	0	20	0
16	比較例4	0	20	2	18	2	0	18

Key: 1 Evaluated results by the mothers
2 The smell of the perfume before a discharge of excretion
3 The change in smell after a discharge of excretion
4 Intensity of the smell of the perfume after a discharge of excretion
5 Detectable
6 Not detectable
9 Proper
10 Offensive (strong)
11 Weak
12 Application Example
13 Comparative Example

As can be clearly shown in the evaluated results in Table IV, only in the diaper of Application Example 1 of this invention was the fragrance detected for the first time after a discharge of excretion, all testers were able to smell the fragrance, and the fragrance was not offensive.

[0026]

Effect of invention

As clearly explained above, the volatile material sealed body, in which a volatile material is sealed within a water-soluble covering material, is contained within an liquid-absorbing core, between the absorbing core and the liquid-impermeable back sheet, or between the liquid-absorbing core and the liquid-permeable top sheet, the water-soluble covering material is dissolved by the water of an excretion and the volatile material is released in the disposable diaper in this invention. Therefore, the volatile material can be immediately volatilized when an excretion is discharged, and the volatilization of the volatile material before a discharge of excretion can be reliably prevented. As a result, when a volatile material sealed body, in which a perfume is sealed is used in baby diapers, the fragrance is released when urine is discharged, a mother, for example, immediately notices the discharge of urine and can change the diaper at the proper time. Also, when a volatile material sealed body, in which an odor-removing agent is sealed is used in diapers for adults, the odor-removing agent is released when urine is discharged, and actions can be immediately taken to remove the odor of the urine discharge.

Brief description of the figures

Figure 1 is a partially cut oblique diagram showing an implementation example of a disposable diaper to which this invention is applied.

Figure 2 is a top view diagram showing an example of a volatile material sealed body.

Figure 3 is a cross-sectional diagram of a conceptual central part of the volatile material sealed body in Figure 2.

Explanation of the numbers

1 brief style diaper
2 liquid-permeable top sheet
3 liquid-impermeable back sheet
4 liquid-absorbing core
18 volatile material sealed body
19 water-soluble covering material
20 perfume (volatile material).

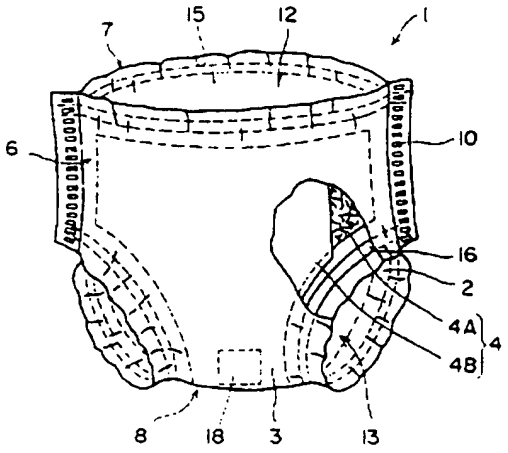


Figure 1

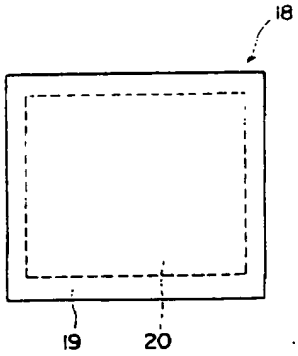


Figure 2

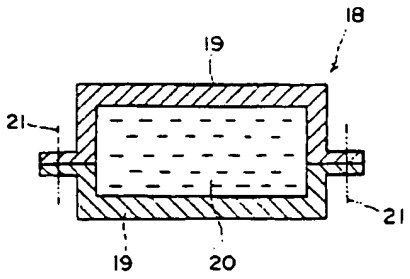


Figure 3